

DESERET CHEMICAL DEPOT

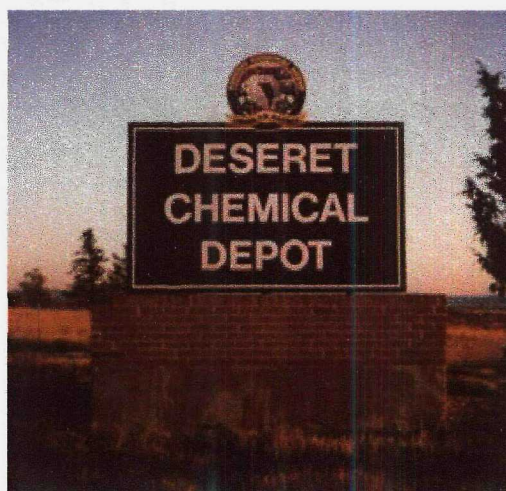
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MAY 11 2006

CAMDS PART B PERMIT Permit Attachments 3 & 16

UTAH DIVISION OF
SOLID & HAZARDOUS WASTE



CAMDS RCRA PART B PERMIT

Class 2 Permit Modification

Submitted to:
Utah Division of Solid & Hazardous Waste
May 2006



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
US ARMY CHEMICAL MATERIALS AGENCY
DESERET CHEMICAL DEPOT
11500 Stark Road
STOCKTON, UT 84071

HAND DELIVERED
06.01738
MAY 11 2006

UTAH DIVISION OF
SOLID & HAZARDOUS WASTE

May 8, 2006

Director of Risk Management

SUBJECT: Class 2 Modification to the CAMDS Part B Permit, Attachments 3 & 16 – CAMDS LMQCP and Site Agent Monitoring Plan. Deseret Chemical Depot, EPA I.D. Number UT5210090002.

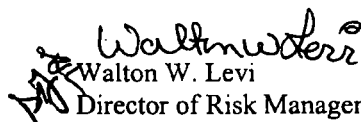
Mr. Dennis Downs
Executive Secretary
Attn: Ms. Michelle Weis
Department of Environmental Quality
Division of Solid and Hazardous Waste
P.O. Box 144880
Salt Lake City, Utah 84114-4880

Dear Mr. Downs:

DCD submits the enclosed Class 2 modification to Attachments 3 and 16 of the CAMDS Part B Permit [in accordance with 40 CFR 270.42(b)] to update sections of the Laboratory & Monitoring Quality Control Plan (LMQCP) and Site Agent Monitoring Plan. Updates to these plans are being made to clarify hazard category definitions and other sections of the plans to reflect current monitoring requirements at CAMDS. Proposed changes to the permit sections are enclosed.

If you have any questions regarding this modification, please contact Mr. Lyman Thorpe at (435) 833-4424.

Sincerely,


Walton W. Levi
Director of Risk Management
*CERTIFICATION STATEMENT

Enclosures
CD-ROM

PUBLIC NOTICE

PUBLIC NOTICE

Notice is hereby given that the Deseret Chemical Depot (DCD), State EPA ID Number UT5210090002, has submitted a request to the Utah Division of Solid and Hazardous Waste for the following modification to the CAMDS Part B Operation Permit:

Class 2 Modification to Update the CAMDS Agent Monitoring Plans, CAMDS Permit Attachments 3 and 16. Changes are being made to these permit sections to reflect current operating procedures, clarify hazard category definitions and provide a mechanism for reduced monitoring in decontaminated operating areas.

A 60 day public comment period for this modification request will begin on May 11, 2006, and end on July 10, 2006. All comments must be submitted in writing to Mr. Dennis Downs, Executive Secretary, Division of Solid and Hazardous Waste, Utah Department of Environmental Quality, Cannon Health Building, 288 North 1460 West, Salt Lake City, Utah, 84116.

DCD will conduct a public information meeting concerning this modification request on June 7, 2006, at 6:00 PM at the Tooele Chemical Stockpile Public Outreach Office, 54 South Main Street, Tooele, UT.

Questions may be directed to DCD by contacting Mr Lyman Thorpe at (435) 833-4413; or the Utah Department of Environmental Quality, Division of Solid and Hazardous Waste, by contacting Mr. Brad Lauchnor at (801) 538-6170. The Permittee's (DCD) compliance history is also available from Mr. Lauchnor.

A copy of this modification request is available for review by the general public at the Utah Department of Environmental Quality, Division of Solid and Hazardous Waste, Cannon Health Building, 288 North 1460 West, Salt Lake City, Utah; and at the Tooele Chemical Stockpile Public Outreach Office, 54 South Main Street, Tooele, UT.

Note for Media Addresses:

This notice is for informative purposes in accordance with the requirements of the Utah Department of Environmental Quality, Division of Solid and Hazardous Waste; and not a request for publication.

MOD SUMMARY

**Class 2 Modification to the CAMDS Part B Permit
Permit Attachments 3 & 16**

Modification Summary

Section	Description	Description of Modification(s) to Sections
Description of Modification		Description of Modification
Attachment 3	Site LMQCP	Specific changes to plan are enclosed
Attachment 16	Site Agent Monitoring Plan	Specific changes to plan are enclosed

MOD DESCRIPTION

PERMIT MODIFICATION DESCRIPTION

A. Permit Modification Title:

Class 2 Modification of Permit Attachments 3 and 16.

B. Description/ Justification of Modification Request

Modification of sections of the Monitoring Plans (Attachment 3 & 16) to provide more accurate hazard category descriptions and procedures for reduction of monitoring in areas where agent hazard has been removed. Other minor changes to the plans are also proposed. Redline changes to both permit sections are enclosed.

C. Class of Modification

This modification is designated as a Class 2 modification in accordance with 40 CFR 270.42, Appendix I, A, 4.b.: changes in frequency of or procedures for monitoring – other changes.

D. Clarification of Hazard Category Definitions in Permit Attachments 3 & 16

This mod is requested to reduce the confusion between ventilation and hazard categories. Both categories are designated with the Letters A – E. This modification also provides a mechanism for reduction of monitoring in categories A/B and C through decontamination and collection of monitoring data.

Due to the closure of CAMDS there is no processing of neat chemical agents planned in the future. Because of this, the definitions of the hazard categories, Table 5-2 (Attachment 3) should be changed to reflect the hazards expected during the closure of the CAMDS facilities. Table 4.0 in Attachment 16 has been similarly revised.

HAZARD CATEGORY Classifications at the CAMDS Site	
Table 5-2	
A – A toxic area designated for probable liquid and vapor agent contamination.	
B – A toxic area designated for possible vapor agent contamination.	
C – A non-toxic area where low level vapor contamination is unlikely but possible.	
D – The non-toxic area considered uncontaminated.	
E – Areas where closure projects have been completed, all equipment and hazards have been removed and the area has been certified clean for closure demolition.	

Monitoring requirements will remain the same as previous for each individual hazard designation, the safety of the workers will be increased by raising the understanding and awareness of the hazard categories.

ATTACHMENT 3

ENCLOSURE 1

Permit Attachment 3
Proposed Changes

ATTACHMENT 3

The CAMDS Site Laboratory and Monitoring Quality Control Plan

~~August 2005~~May 2006 |

August 2005 May 2006

4.2 CAMDS MONITORING AREAS

In the demilitarization plant area, hazard category classifications (as defined in Table 5-2) and personnel occupancy are the factors used to determine monitoring activities. When monitoring is conducted for personnel protection or to assess potential personnel exposure, the monitoring must be sufficient to identify, verify, and quantify the agent. STEL and WPL monitoring is performed in areas of the facility where workers may have a potential exposure to chemical warfare agent.

Monitoring in Category A and B areas, including LSS Air Monitoring, for past agent contamination may be discontinued when the airborne agent contamination for that area is less than 1.0 STEL over a 24-hour period, at a minimum temperature of 70° F, with the ventilation system operating at the approved flow rates. A confirmed agent reading at or above 1.0 STEL requires that the area must undergo additional decontamination. LSS hose monitoring for past agent may be discontinued if the hoses are less than 1.0 WPL.

Monitoring in Category C areas for past agent contamination may be discontinued when the Category C area has been less than 0.5 WPL^(12-hour) for each agent being discontinued over a 24-hour period, with the adjacent Category A & B area ventilation systems operating at the approved flow rates at a minimum temperature of 70°F.

The change in category areas will be documented using the Request for Change Form-5020-E and will be kept on file in the CMO.

CAMDS Monitored Areas

In the demilitarization plant area, hazard category classifications and personnel occupancy are the factors used to determine monitoring activities. When monitoring is conducted for personnel protection or to assess potential personnel exposure, the monitoring must be sufficient to identify, verify, and quantify the agent. STEL and WPL monitoring is performed in areas of the facility where workers may have a potential exposure to chemical warfare agent.

4.2.1 Toxic Area-Probable Liquid/Vapor Agent Contamination Areas-Category A and B

These A/B areas (LIC primary chamber, BIF Drain Area) are potentially contaminated with liquid agent or agent vapor. These areas are only monitored using NRT monitors. No confirmation monitoring is necessary because the presence of chemical agent is expected. The agent concentrations determine the Personnel Protective Equipment (PPE) that is required for personnel entry. At times, the monitoring may be enhanced to allow the PPE for specific toxic areas to be reduced to enhance worker mobility. Reduction of PPE requires Safety Officer approval. Enhanced monitoring may include changing the NRT monitors to a more sensitive detection level or by adding DAAMS in order to confirm or deny an NRT alarm.

CWM And Hazardous Waste Process Areas

Toxic and Process areas are potentially contaminated with liquid agent or agent vapor. These areas are monitored using NRT monitors. No confirmation monitoring is necessary because the presence of chemical agent is expected. The agent concentrations determine the Personnel Protective Equipment (PPE) that is required for personnel entry. At times, the monitoring may be enhanced to allow the PPE for specific toxic areas to be reduced to enhance worker mobility. Reduction of PPE requires Safety Officer approval. Enhanced monitoring may include changing

~~the NRT monitors to a more sensitive detection level or by adding DAAMS in order to confirm or deny an NRT alarm.~~

4.2.2 CWM and Hazardous Process Area Airlocks

Non-Toxic-Low Vapor Agent Contamination Areas –Category C

These areas (airlocks, shower and doffing rooms) serve as access/egress points between contaminated areas (A and B) and clean work areas. These are areas where contaminated and potentially contaminated materials are handled but not processed. These areas are also rooms that are connected directly via ventilation to A and B areas. These areas are monitored with NRTs at the STEL and at the WPL level daily.

To limit the transfer of hazardous waste from "toxic" areas to "work areas", under normal conditions, items and personnel are cleared through an airlock or egress area. Adherence to written procedures governing the proper egress from areas where hazardous waste is being processed is required. These procedures shall ensure that equipment, clothing, or personnel exiting hazardous waste process areas do not spread hazardous waste outside of these areas. All personnel involved in toxic/process area operations shall be trained in proper egress procedures. Egress procedures shall include both proper NRT monitoring to confirm chemical agent readings, are less than the action level, where required, but also procedures to ensure all types of hazardous waste are not tracked outside the process areas.

~~Toxic and Process area airlocks serve as access/egress points between contaminated areas (agent or other hazardous wastes) and clean work areas. To limit the transfer of hazardous waste from "toxic" areas to "work areas", under normal conditions, items and personnel are cleared through~~

Table 4-1: High-Level Agent Detector Response Times.

AGENT	DETECTOR	RESPONSE TIME TO IDLH/GLD LEVELS (minutes)
GB	NRT 1	2.17 IDLH
VX	NRT 1	2.17 IDLH
H	NRT 1	2.17 GLD

Table 4-2: Low-Level Detector Rapid Response Times to STEL Levels.

AGENT	DETECTOR	RESPONSE TIME to STEL LEVELS (minutes)
GB	ACAMS ⁽¹⁾	3
GB	MINICAMSTM	5
VX	ACAMS	5
VX	MINICAMSTM	3
H	ACAMS ⁽¹⁾	5
H	MINICAMSTM	5
L	MINICAMSTM	10

(1) SEL Monitoring Levels are the same response time.

Table 4-3: Low-Level Rapid Response Detectors to SEL Levels.

AGENT	DETECTOR	RESPONSE TIME to SEL LEVELS (minutes)
GB	ACAMS	3
GB	MINICAMS™	5
VX	ACAMS	5
VX	MINICAMS™	5
H	ACAMS	3
H	MINICAMS™	5

Table 4-4: Sampling Times of Historical and Perimeter Monitors.

AGENT	SAMPLING SYSTEM	AGENT EXPOSURE LIMIT	SAMPLING TIME (hours) ⁽¹⁾
GA/GB	DAAMS	WPL	2 or 12
		SEL	4
		GPL	24
VX	DAAMS	WPL	2 or 12
		SEL	4
		GPL	24
H, L	DAAMS	WPL	2 or 12
		SEL	4
		GPL	12

(1) 12-Hour samples are used to certify laundry and protective equipment are clear of agent and to certify Life Support System (LSS) air. This certification of LSS air is good for 24 hours.

~~an airlock or egress area. Adherence to written procedures governing the proper egress from areas where hazardous waste is being processed is required. These procedures shall ensure that equipment, clothing, or personnel exiting hazardous waste process areas do not spread hazardous waste outside of these areas. All personnel involved in toxic/process area operations shall be trained in proper egress procedures. Egress procedures shall include both proper NRT monitoring to confirm chemical agent readings, are less than the action level, where required, but also procedures to ensure all types of hazardous waste are not transferred outside the process areas.~~

4.2.3 Non-Toxic Uncontaminated Work Areas-Category D

Within the CAMDS site there are many areas inhabited by workers where non-toxic work operations are taking place. These areas are not "under engineering control" and have little or no potential for vapor contamination. These areas are not normally monitored for agent, however DAAMS only stations will be used to monitor areas adjacent to dilute agent storage areas or in areas where samples are screened and analyzed. In particular the SAF lab lunch rooms and analytical labs will be monitored at the WPL levels.

Outside of Process Areas

~~"Outside of process areas" is defined to be where agent vapor is not normally expected, but could exist. These areas are monitored with NRT monitors at the STEL and at the WPL level daily. Any exceptions to this requirement shall require the approval of the Executive Secretary.~~

4.2.4 Non-Toxic Work Areas

~~Within the CAMDS Site there are many areas inhabited by workers where non-toxic work operations are taking place. These areas are not "under engineering control" and have little or no potential for vapor contamination. These areas are not monitored for agent.~~

4.2.5 Lunch Rooms and Smoking Areas

~~Areas at the CAMDS Site that have been designated for eating, drinking and smoking and are not in process area, process support areas, or workspace process areas do not require agent monitoring. The lunchrooms in the SAF and the Monitoring building are defined per this Permit as process support areas and shall be monitored for chemical agent.~~

4.2.6 Positive Pressure Areas

The Control Module Operations area, Medical Module and Personnel Support Complex are the only areas which have the capability to switch the ventilation system to positive pressure when an agent alarm occurs in an area outside of engineering control. This allows personnel in these areas to perform work, without the need of a mask or protective clothing, if an upset condition exists. Agent operations do not occur in these areas and with positive air pressure and there is no potential for vapor contamination.

4.2.7 Filter Monitoring

Multiple Bank Carbon Filter units (Appendix 18) provide negative pressure ventilation for potentially contaminated areas throughout the plant.

Six-Bank HVAC Filters

Filter mid-beds - The filter mid-bed locations (after banks one, two, and four) shall be monitored continuously with DAAMS for Mustard, GB, and VX at the WPL (12 hour) and for any other agents with which the carbon has been potentially contaminated.

Filter Stack - NRT monitors shall be used to monitor for each agent being processed in the plant at the STEL (action level 0.5). DAAMS stations continuously monitor the HVAC Filter Stack for GB, VX, and Mustard at the WPL (12 hour).

CAMDS Laboratory HVAC Filters

DAAMS shall monitor for GB, VX, GA, Mustard, and Lewisite between carbon banks 1 and 2, and at the Filter Stacks at the WPL (12 hour). The Filter exhaust Stacks shall be monitored with NRT monitors for GB and VX at the STEL (action level 0.5).

4.2.8 MPF Stack

The MPF Stack is continuously monitored, by both NRT monitors and DAAMS, at the SEL level for all agents being processed in the facility. The SEL provides an early indication of upset

Table 5.1: Agent AEL levels.

Agent	AEL Levels (mg/m ³)					
	GPL	WPL		STEL	IDLH	SEL
GA, GB	1 x 10 ⁻⁶ (24 hours)	2 x 10 ⁻⁵ (12 hours)	6 x 10 ⁻⁵ (2 hours)	1 x 10 ⁻⁴ 15 minutes	1 x 10 ⁻¹ ≤30 minutes	3 x 10 ⁻⁴
VX	6 x 10 ⁻⁷ (24 hours)	6 x 10 ⁻⁷ (12 hours)	4 x 10 ⁻⁶ (2 hours)	1 x 10 ⁻⁵ 15 minutes	3 x 10 ⁻³ ≤30 minutes	3 x 10 ⁻⁴
H agents	2 x 10 ⁻⁵ (12 hours)	2.7 x 10 ⁻⁴ (12 hours)	1.6 x 10 ⁻³ (2 hours)	3 x 10 ⁻³ 15 minutes	7 x 10 ⁻¹ ≤30 minutes	3 x 10 ⁻²
Lewisite	3 x 10 ⁻³ (12 hours)	3 x 10 ⁻³ (12 hours)	3 x 10 ⁻³ (2 hours)	3 x 10 ⁻³ 15 minutes	Not Established	3 x 10 ⁻²

5.3 Hazard Category Areas

Table 5-2 defines the Hazard Category Areas at the CAMDS Site ~~and their designated activities.~~

Table 5-2: Hazard Category Areas at the CAMDS Site.

Category Area	<u>Activities</u> <u>DEFINITION</u>
A	<u>A toxic area designated for probable liquid and vapor agent contamination.</u> The toxic processing area supported by the cascade ventilation system designated for probable liquid and vapor agent contamination (for example, munitions processing bay, toxic cubicle).
B	<u>A toxic area designated for possible vapor agent contamination.</u> The toxic processing area supported by the cascade ventilation system is designated for possible vapor agent contamination only.
C	<u>A non-toxic area where low level vapor contamination is unlikely but possible.</u> The nontoxic work area adjacent to Category A or B areas that is supported by the cascade ventilation system designated for possible low level vapor agent contamination.
D	The nontoxic work area designation for areas considered uncontaminated.
E	<u>Areas where closure projects have been completed, all equipment and hazards have been removed and the area has been certified clean for closure demolition. The area designated for a positive pressure, filtered air environment.</u>

6.0 STANDARD PREPARATION AND SOLUTION VALIDATION

The standard solutions used for method and monitor calibration, along with the Chemical Agent Standard Analytical Reference Materials (CASARM) from which they are made, play an

16.1 Line Challenges Specific to the MPF Stack

16.1.1 MPF Stack NRT Sample Lines

MPF NRT sample are challenged through the probe and sample lines, per this Permit every four hours and thus do not need to be in the sample line challenge rotation schedule every 60 days.

16.1.2 MPF Stack DAAMS Sample Lines

Upon approval of this modification the MPF stack DAAMS sample lines for HD and GB shall be challenged once a week for four weeks. If all first sample line challenges pass on these four weekly challenges, then the sample lines shall be challenged again 30 days later. If this 30 day first line challenge passes, then the sample line challenges for the HD and GB DAAMS sample lines, on the MPF stack, shall be challenged once every 60 days \pm 5 days.

DAAMS VX sample lines, on the MPF stack, shall be challenged every four hours when the V-G conversion pads are changed out. The challenges shall demonstrate a recovery of $\pm 25\%$. As VX DAAMS sample lines are challenged every four hours they do not need to be in the sample line challenge rotation schedule every 60 days.

16.2 NRT Monitors Sample Line Challenge

If the initial line challenge fails, then the operator shall immediately re-challenge the line. If the second line challenge fails, then corrective action shall be undertaken and all monitoring instrumentation associated with the failed line shall be taken off line. The CMO shall be notified immediately, that the area is no longer being monitored and the CMO shall post or restrict the area to personnel without the appropriate PPE until corrective action is completed and the monitoring system is back in control. All notifications and subsequent actions must be documented in the CMO logbook.

16.3 DAAMS Tubes Sample Line Challenge

Analytical results from the first line challenge using DAAMS tubes shall be available within 72 hours from the time the line was challenged. If the first line challenge fails, then the line shall be immediately re-challenged. The analytical results for the second line challenge shall be available within four hours from the time the line was challenged. If the second line challenge fails, then corrective action shall be undertaken and all monitoring instrumentation associated with the failed line shall be taken off line. The CMO shall be notified immediately, that the area is no longer being monitored and the CMO shall post or restrict the area to personnel without the appropriate PPE until corrective action is completed and the monitoring system is back in control. All notifications and subsequent actions must be documented in the CMO logbook.

Additionally for perimeter sample line failures, the Emergency Operation Center (EOC) shall be notified that the monitoring station affected is not operational.

16.4 Mobile NRT monitors

Heated lines for Mobile NRT monitors shall be challenged, at the distal end daily and prior to the beginning of operations, with agent concentrations at the RL, to ensure continuity (IAW Sections 16.0 – 16.2).

randomly selected in the lot, spiked at 1.66 ng chemical agent VX. Their recoveries will be compared with the average recovery of three spikes at 0.88 ng of GB. The peak area for each conversion pad will be divided by 76.5% to account for the conversion efficiency of the pad.

An acceptable pad is one that has a recovery of greater than 75%. A lot will be rejected if the maximum number of rejected pads, as determined by the testing procedure, is obtained. All chemical test data, whether passing or failing, is recorded.

17.2.1 Replacement Frequency

According to NIOSH's recommendation in "*Special Report on VX: Evaluation of Pesticide Interference and Evaluation of Conversion Pad Service Life*," conversion pads for all-level methods will be replaced as listed below for each Class 1 method/monitor station during VX operations. Pad replacement will occur as listed below:

1. For IDLH-levels every eight hours or more frequent at the discretion of the technician.
2. For SEL on the MPF stack the conversion pads shall be changed out every four hours.
3. Conversion pads on the MDC2 ovens shall be changed after every treatment cycle.
4. Filter stacks and midbeds shall be changed every 28 days pads.
5. Other areas at the STEL/WPL and the perimeter DAAMS stations (GPL) shall be changed every 7 days or more frequently at the discretion of the technician.
6. Conversion pads must be stored in a light-tight container to maximize the pad's ability to convert VX to a G analog and to minimize exposure to atmospheric contamination.

17.3 NOX Filters

In order to retain chemical agent Mustard on the DAAMS tube, Nitrogen Oxide pre-filters shall be required for Mustard sample collection. Nitrogen oxides (NOX) pre-filters will be tested by visually inspecting the nitrogen oxides pre-filter for cracks, packing separation, and other physical defects. All Mustard DAAMS sample line challenges shall be completed through the NOX filter.

Data is submitted with this modification to support changing the NOx filter replacement requirement from 1 wk 2 wks.

17.3.1 Replacement Frequency

NOX pre-filters shall be replaced on the MPF stack monitoring instrumentation daily and a minimum of 12 hours is required between pre-filter change-outs. All other Nitrogen Oxide pre-filters shall be replaced bi-weekly, including the Perimeter DAAMS stations.

17.4 Pre-concentrator Tubes Replacement Frequency

Pre-concentrator Tubes (PCT) shall be replaced as needed, by monitoring operators, based upon challenge performance.

18.0 DATA REDUCTION, VALIDATION, AND REPORTING

LAB analysts will record data on the Data Analysis Report and submit it to the QC Coordinator immediately after test results are obtained. The QC Coordinator will immediately review the data for completeness, legibility, accuracy, and any type of unusual problems with the data. The QC Coordinator will initial and date the report upon review completion.

ENCLOSURE 2

Permit Attachment 16
Proposed Changes

ATTACHMENT 16

ATTACHMENT 16

THE CAMDS Site Monitoring Plan

~~August 2005~~May 2006 |

3.0 AGENT AIRBORNE EXPOSURE LIMITS (AEL), EMISSION LIMITS AND CATEGORY AREAS

Airborne Exposure Limits (AEL) for monitored agents at the CAMDS Site are compiled in Table 3-1. AEL are standards that are set by the CDC in the Federal Register 68 58348 (October 9, 2003) for GA, GB, and VX, and FR 69 24164 (May 3, 2004) Mustard. Lewisite was not updated from the previous Federal Register 53 8504-8508 (March 15, 1988). Agent AEL levels are listed in Table 3-1.

3.1 AEL Definitions

3.1.1 Immediately Dangerous to Life and Health (IDLH)

IDLH is the maximum concentration, in the event of respirator failure, where a person could escape, within 30 minutes, without a respirator and without experiencing any escape impairing (e.g. severe eye irritation) or irreversible health effects.

IDLH levels are 0.1 mg/m³ for GB/GA, 0.003 mg/m³ for VX, and for Lewisite 0.7 mg/m³ for Mustard. The Mustard IDLH is only based on non-carcinogenic effects.

3.1.2 Short Term Exposure Limit (STEL)

STEL is the maximum concentration to which unprotected chemical agent workers may be exposed to for up to 15 minutes, continuously. The STEL for GB/GA is 1×10^{-4} mg/m³ with a limit of four daily exposures. The STEL limit for VX is 1×10^{-5} and the limit for Mustard is 3×10^{-3} . Only one exposure daily is allowed at the STEL for VX and for Mustard.

3.1.3 Worker Population Limit (WPL)

WPL is the average allowable concentration that an unmasked worker could be exposed to for an 8 to 12 hours workday 40 hours per week for 30 years without adverse effects. The WPL for the CAMDS has been adjusted to reflect a 12-hour work shift. The 12-hour WPL for GB/GA is 2×10^{-5} , VX is 6×10^{-7} , and HD is 2.7×10^{-4} .

3.1.4 General Population Limit (GPL)

The GPL is a allowable 72-hour time-weighted average concentration for the general population. The limit applies to the entire population, including all ages and medical conditions. For GB, the GPL is 1×10^{-6} mg/m³ for 24 hours. For VX, the GPL is 6×10^{-7} mg/m³ for 24 hours. For HD, the GPL is 2×10^{-5} mg/m³ for 12 hours.

3.2 Other Non-health Based Emission Limits

3.2.1 Source Emission Limit (SEL)

Source Emission Limit was previously known as the Allowable Stack Concentration (ASC). SEL is a ceiling value that serves as a source emission limit, and not as a health standard. The SEL is used for monitoring the MPF stack. The SEL provides an early indication of upset conditions, and must be accurately measurable in a timely manner.

It should be noted when monitoring at the MPF stack, that because of the high temperature and moisture content of stack emissions, dilution control devices are used in conjunction with the NRT monitors and DAAMS. The SEL value for GB and VX is 0.0003 mg/m³ and Mustard is 0.03 mg/m³.

Table 3-1: Agent AEL level, Stack Limits and Aspirations Times.

Agent	AEL Levels and Stack Limits (mg/m ³)						
	GPL	WPL			STEL	IDLH	SEL
GA, GB	1 x 10 ⁻⁶ (24 hours)	2 x 10 ⁻⁵ (12 hours)	6 x 10 ⁻⁵ (4 hours)	6 x 10 ⁻⁵ (2 hours)	1 x 10 ⁻⁴ 15 minutes	1 x 10 ⁻¹ ≤30 minutes	3 x 10 ⁻⁴
VX	6 x 10 ⁻⁷ (24 hours)	6 x 10 ⁻⁷ (12 hours)	2 x 10 ⁻⁶ (4 hours)	4 x 10 ⁻⁶ (2 hours)	1 x 10 ⁻⁵ 15 minutes	3 x 10 ⁻³	3 x 10 ⁻⁴
H agents	2 x 10 ⁻⁵ (12 hours)	2.7 x 10 ⁻⁴ (12 hours)	8 x 10 ⁻⁴ (4 hours)	1.6 x 10 ⁻³ (2 hours)	3 x 10 ⁻³ 15 minutes	7 x 10 ⁻¹	3 x 10 ⁻²
Lewisite	3 x 10 ⁻³ (12 hours)	3 x 10 ⁻³ (12 hours)	3 x 10 ⁻³ (4 hours)	3 x 10 ⁻³ (2 hours)	3 x 10 ⁻³ 15 minutes	Not Established	3 x 10 ⁻²

4.0 HAZARD CATEGORY AREAS

Definitions of HAZARD Category Areas at the CAMDS ~~site and their designated activities can be~~ are found in Table 4-1, below.

Table 4-1: Definitions of Hazard Category Areas ~~and designated activities~~.

Category Area	<u>Activities</u> <u>Definition</u>
A	A toxic area designated for probable liquid and vapor agent contamination. The toxic processing area supported by the cascade ventilation system designated for probable liquid and vapor agent contamination (for example, munitions processing bay, toxic cubicle).
B	The toxic processing area supported by the cascade ventilation system is designated for possible vapor agent contamination only. A toxic area designated for possible vapor agent contamination.
C	The nontoxic work area adjacent to Category A or B areas that is supported by the cascade ventilation system designated for possible low level vapor agent contamination. A non-toxic area where low level vapor contamination is unlikely but possible.
D	The nontoxic work area designation for areas considered uncontaminated.
E	The area designated for a positive pressure, filtered air environment. Areas where closure projects have been completed, all equipment and hazards have been removed and the area has been certified clean for closure demolition.

5.0 MONITORING EQUIPMENT AND AGENTS MONITORED

The Monitoring Division provides the monitoring support for the CAMDS Site, DCD Perimeter, and Area 10 and TOCDF CAL Laboratory. Before each individual agent campaign the monitoring system is operated in the configuration in which it will be used during the campaign. This is known as baseline operations. The purpose for the baseline is to provide evidence that the whole system will perform within required tolerances and requirements, and to document the configuration of the system at the time of the baseline.

The Monitoring Division has capabilities to monitor for the following five chemical agents using various monitoring equipment, which includes NRT monitors, DAAMS, RTAPS, and M8A1 detectors:

- ~~a.1.~~ GB (Isopropylmethylphosphonofluoridate),
- ~~b.2.~~ VX [O-ethyl S-(2-diisopropylaminoethyl) methylphosphonothiolate],
- ~~c.3.~~ Mustard [bis(2-chloroethyl) sulfide]
- ~~d.4.~~ GA[Ethyl N, N-dimethylphosphoramidate-cyanidate]
- ~~e.5.~~ Lewisite [dichloro-2-chlorovinyl arsine]

5.1 Near Real Time Monitors

The Near Real Time (NRT) Monitors are configured to monitor one or more of the chemical agents being processed at the Site. NRT monitors are used to monitor the operational areas, filters, and stacks. NRT monitors may monitor at the STEL, WPL, SEL, and IDLH concentrations of chemical agents GA, GB, VX, Mustard, and Lewisite.

5.2 Depot Area Air Monitoring System

Depot Area Air Monitoring System (DAAMS) collects air samples to detect chemical agents GA, GB, VX, Mustard, and Lewisite for confirmation of NRT monitor alarms and as primary historical monitors in areas not monitored by NRT monitors. Analysis of DAAMS samples provides confirmation of agent if concentrations are at or above the defined Reporting Limit (RL). Instrumentation used for agent confirmation are the Gas Chromatography/Flame Photometric Detector (GC/FPD) (DAAMS Class I Method) or GC-Mass Selective Detector (GC-MSD).

5.3 Real Time Analytical Platform (RTAPS)

Real Time Analytical Platforms are mobile NRT monitoring stations used in situations where NRT monitoring is required but the location does not have any temporary (fixed) or permanent stations.

5.4 Dilution Air Flow Controllers (DAFC)

Both the NRT monitor and DAAMS use dilution airflow controllers. The purpose of the dilution flow controllers is to inject dry air into the sample stream to prevent the liquid in the sample from condensing in the sampling equipment, keeping the sample above the dew point. The dilution flow controllers are designed such that the flow control device has a feedback signal to a flow meter. This feedback signal causes the ratio of the sample flow to stay constant once the two are locked together. Therefore, the unit compensates for any interruptions in the sample flow and maintains the correct ratio. The agent concentration in the DAAMS tubes is calculated using the volume of sample air, not the dilution air. The same theory of operation holds true with the NRT monitors. The NRT monitors are calibrated disregarding the quantity of dilution air. The dilution air can be considered a carrier for the sample. The agent concentration is based on the volume of the sample. The ratio of air to sample for the DAFC is 10:1.

5.5 Backup Equipment

The function of the NRT monitor is to rapidly detect agent. Should a needed instrument fail, the first response is to troubleshoot and repair it in place. Should the estimated repair time be in excess of 1.5 hours the NRT monitor shall be replaced with an NRT monitor from the contingency stock.

6.0 CAMDS MONITORING AREAS

In the demilitarization plant area, hazard category classifications (as defined in Table 4-1) and personnel occupancy are the factors used to determine monitoring activities. When monitoring is conducted for personnel protection or to assess potential personnel exposure, the monitoring must be sufficient to identify, verify, and quantify the agent. STEL and WPL monitoring is performed in areas of the facility where workers may have a potential exposure to chemical warfare agent.

Monitoring in Category A and B areas, including LSS Air Monitoring, for past agent contamination may be discontinued when the airborne agent contamination for that area is less than 1.0 STEL over a 24-hour period, at a minimum temperature of 70° F, with the ventilation system operating at the approved flow rates. A confirmed agent reading at or above 1.0 STEL requires that the area must undergo additional decontamination. LSS hose monitoring for past agent may be discontinued if the hoses are less than 1.0 WPL.

Monitoring in Category C areas for past agent contamination may be discontinued when the Category C area has been less than 0.5 WPL^(12-hour) for each agent being discontinued over a 24-hour period, with the adjacent A& B area ventilation systems operating at the approved flow rates at a minimum temperature of 70°F.

The change in category areas will be documented using the Request for Change Form-5020-E and will be kept on file in the CMO.

6.1 CAMDS Site Areas

6.1.1 Toxic Area-Probable Liquid/Vapor Agent Contamination Areas-Category A and B CWM And Hazardous Waste Process Areas

~~Toxic and Process~~ These A/B areas (eg. LIC tank room and primary chamber, BIF Drain Area) are potentially contaminated with liquid agent or agent vapor. ~~These~~ These areas are only monitored using NRT monitors. No confirmation monitoring is necessary because the presence of chemical agent is expected. The agent concentrations determine the Personnel Protective Equipment (PPE) that is required for personnel entry. At times, the monitoring may be enhanced to allow the PPE for specific toxic areas to be reduced to enhance worker mobility. Reduction of PPE requires Safety Officer approval. Enhanced monitoring may include changing the NRT monitors to a more sensitive detection level or by adding DAAMS in order to confirm or deny an NRT alarm.

6.1.2 Non-Toxic-Low Vapor Agent Contamination Areas -Category CCWM and Hazardous Process Area Airlocks

~~These areas (Toxic and Process area airlocks, shower and doffing rooms)~~ serve as access/egress points between contaminated areas (A and B) (~~agent or other hazardous wastes~~) and clean work areas. These are areas where contaminated and potentially contaminated materials are handled but not processed. These areas are also rooms that are connected directly via ventilation to A and B areas. - These areas are monitored with NRTs at the STEL and at the WPL level daily.

To limit the transfer of hazardous waste from "toxic" areas to "work areas", under normal conditions, items and personnel are cleared through an airlock or egress area. Adherence to written procedures governing the proper egress from areas where hazardous waste is being processed is required. These procedures shall ensure that equipment, clothing, or personnel exiting hazardous waste process areas do not spread hazardous waste outside of these areas. All

personnel involved in toxic/process area operations shall be trained in proper egress procedures. Egress procedures shall include both proper NRT monitoring to confirm chemical agent readings, are less than the action level, where required, but also procedures to ensure all types of hazardous waste are not tracked outside the process areas.

6.1.3 — Outside of Process Areas

~~“Outside of process areas” is defined to be where agent vapor is not normally expected, but a potential exists for low level vapor contamination. These areas are monitored with NRTs at the STEL and at the WPL level daily. Any exceptions to this requirement shall require the approval of the Executive Secretary.~~

6.1.4 Non-Toxic Uncontaminated Work Areas-Category D

Within the CAMDS site there are many areas inhabited by workers where non-toxic work operations are taking place. These areas are not "under engineering control" and have little or no potential for vapor contamination. These areas are not normally monitored for agent, however, DAAMS only stations will be used to monitor areas adjacent to dilute agent storage areas or in areas where samples are screened and analyzed. In particular the SAF lab lunch rooms and analytical labs will be monitored at the WPL levels.

6.1.5 — Lunch Rooms and Smoking Areas

~~Areas at the CAMDS Site that have been designated for eating, drinking and smoking and are not in process area, process support areas, or workspace process areas do not require agent monitoring. The lunchrooms in the SAF and the Monitoring building are defined per this Permit as process support areas and shall be monitored for chemical agent.~~

6.1.6 Positive Pressure Areas

The Control Module Operations area, Medical Module and Personnel Support Complex are the only areas which have the capability to switch the ventilation system to positive pressure when an agent alarm occurs in an area outside of engineering control. This allows personnel in these areas to perform work, without the need of a mask or protective clothing, if an upset condition exists. Agent operations do occur in these areas and with positive air pressure there is no potential for vapor contamination.

6.1.7 Filters

Multiple Bank Carbon Filter units (Appendix 18) provide negative pressure ventilation for potentially contaminated areas throughout the plant.

Six-Bank HVAC Filters

Filter mid-beds - The filter mid-bed locations (after banks one, two, and four) shall be monitored continuously with DAAMS for Mustard, GB, and VX at the WPL (12 hour) and for any other agents with which the carbon has been potentially contaminated.

Filter Stack - NRT monitors shall be used to monitor for each agent being processed in the plant at the STEL (action level 0.5). DAAMS stations continuously monitor the HVAC Filter Stack for GB, VX, and Mustard at the WPL (12 hour).

CAMDS Laboratory Two-Bank HVAC Filters

DAAMS shall monitor for GB, GA, VX, Mustard, and Lewisite between charcoal banks 1 and 2, and the Filter Stacks at the WPL (12hour). The Filter exhaust Stacks shall be monitored with NRTs for GB and VX at the STEL (action level 0.5).

6.1.8 MPF Stack

The MPF Stack is continuously monitored, by both NRT monitors and DAAMS, at the SEL level for all agents being processed in the facility. The SEL provides an early indication of upset conditions, and must be accurately measurable in a timely manner. Staggered NRT monitors are required on the MPF stack for each agent. The two staggered NRT monitors shall have differing columns with two identical NRT monitors for backup. DAAMS are used as confirmation for any NRT alarms above the action level. A Waste Feed Cutoff for the MPF is initiated when an alarm at or above the 0.2 SEL action level is exceeded at the MPF stack.

6.1.9 Life Support System (LSS) Air Connects

Life Support System (LSS) air is monitored with DAAMS at the WPL (12 Hours) level daily.

6.1.10 Continuous Emission Monitoring System (CEMS)

The CAMDS Site Continuous Emissions Monitoring System (CEM), non-chemical agent stack monitoring, will be IAW Attachment 17 of this Permit.

6.2 Perimeter Monitoring

The DCD perimeter requires historical monitoring with confirmation monitoring at the GPL level for all chemical agents being processed at the facility or stored in the storage yard. The CAMDS Site provides monitoring and analytical support for the perimeter monitoring. Perimeter Monitoring for a specific agent may only be discontinued if all of the recoverable neat agent, for that specific agent, has been demilitarized.

6.2.1 Perimeter Stations

There are eleven Perimeter Monitoring Stations sampling for GB, VX (24 hour), and Mustard (12 hour) with DAAMS tubes. Each station has a primary, secondary, and tertiary DAAMS tubes for each agent monitored and are analyzed for agent at the GPL. Stations are numbered 901-908 and 910-912. Logbooks documenting all maintenance, inspections and monitoring activities shall be kept current at each station.

6.2.2 GA and Lewisite Monitoring Stations

GA or Lewisite perimeter monitoring shall be accomplished at the storage igloos with DAAMS stations monitoring at the GPL.

6.3 TOCDF CAL Mustard Monitoring

The CAMDS Monitoring Division has the capability to provide GA, Lewisite, and Mustard monitoring and analytical support to the CAL. Currently, the CAMDS provides the CAL with monitoring for Mustard in the areas listed in Table 6-1. Monitoring and analytical support for the CAL will stop after TOCDF is approved to monitor for Mustard, Lewisite, and GA.

Table 6-1: CAL areas supported buy the CAMDS Monitoring Division.

Location Description	Station Number	Monitor Type	AEL Level
CAL Lunchroom	965	DAAMS	WPL (12 hr.)
Room 114	982	DAAMS	WPL (12 hr.)
Room 113	984	DAAMS	WPL (12 hr.)
Medical Support Module	MED-904	DAAMS	WPL (12 hr.)
Monitoring Support Building	MSB-905	DAAMS	WPL (12 hr.)

7.0 QUALITY CONTROL

The CAMDS Site monitoring and analytical QC procedures can be found in Attachment 3, of this Permit.

8.0 AGENT ALARM NOTIFICATION PROCEDURES AND DOCUMENTATION

8.1 MPF Stack Alarm For VX, GB or Mustard

If the NRT monitors alarm at or above 0.2 SEL, the site shall mask, secondary waste processing shall cease, and an automatic waste feed cut-off (AWFCO) shall be initiated for the MPF.

Monitoring personnel shall be deployed. DAAMS tubes shall be pulled and analyzed on the stack. If agent is confirmed, processing of secondary waste shall not proceed until CAMDS has received written approval by the Executive Secretary.

8.2 HVAC Filter Stack Alarm for VX, GB, and Mustard

The HVAC stack NRT monitors alarm at or above 0.5 of the STEL, but the action level is at 0.20 of the STEL. If an NRT monitor reading is at or above the action level of 0.2 STEL, the CMO shall notify monitoring personnel to investigate the NRT monitor. If the NRT monitor goes into alarm (0.5 Z) then the site shall mask, Monitoring personnel shall be deployed, and DAAMS tubes shall be pulled and analyzed.

If agent is confirmed, processing of secondary waste shall not proceed until the CAMDS has received written approval by the Executive Secretary.

8.3 Workplace Monitoring for VX, GB and Mustard (Categories C and D Areas)

If an NRT monitor reading is at or above the action level of 0.2 STEL, the CMO shall notify Monitoring personnel to investigate the NRT monitor. If an NRT monitor alarms at or above 0.5 STEL, the CMO shall mask the site, Monitoring will respond and verify NRT monitor operation and DAAMS tubes shall be pulled and analyzed.

9.0 LIMITING CONDITIONS OF OPERATION (LCOS)

The monitors identified for a given campaign must be operating at all times and are considered to be Limiting Conditions of Operations (LCOS).

10.0 FAILURE TO MONITOR

All of the monitoring identified in this plan must be operating and in control during processing in a given area or it will be considered a "Missed Monitoring" and shall be reported as such, in writing to the Executive Secretary. The following are exceptions:

1. During campaign change transition periods when monitors are being changed to a new campaign.
2. When a Temporary Change has been approved (see Section 12.0).
3. When there are NRT monitors and DAAMS monitoring at a work area, and one or the other is off line for maintenance, repair or calibration, it will not be considered a "Missed Monitoring" as long as the co-located monitor is in control. If the NRT monitor is offline or in malfunction for more than one and a half hours, the DAAMS becomes the primary monitor and therefore must be analyzed. This does not apply to the HVAC stacks, MDC2 ovens, or MPF stack.
4. When a monitor is off line or out-of-control and processing has ceased, personnel have

13.0 MONITOR/MONITORING STATION LOCATIONS AND REPORTS

13.1 Monitor Locations

The monitors at the CAMDS Site are placed in locations to maintain minimum distances to the actual sampling point while keeping the equipment out of hazardous areas. Sampling locations remain fixed; however, sample lines may be adjusted to place NRT monitor and DAAMS equipment at different nearby points to support operational requirements. For the actual monitoring locations at the CAMDS, see Appendix A and the associated drawings.

13.2 Monitoring Station Database

The CAMDS Site has established a Monitoring Station Database (ADAMS) that contains information on the current status of monitoring stations. This database can be accessed to review real time monitoring data.

13.3 Monthly Site Monitoring Plan/Report

Monitoring Division will prepare a Monthly Site Monitoring Plan (Primary and Secondary Report) for operations at the CAMDS Site, and where applicable. The Monthly Site Monitoring Plan is issued to give the most current monitoring information available. The reports and information shown in Appendices A and B are used as examples only. The Information on Primary and Secondary Monitoring Reports is constantly changing.

The Monthly Site Monitoring Plan reflects the chemical agent monitoring as of the time of the report. Monitoring changes occur as operational requirements change. An up-to-date and accurate Primary and Secondary Monitoring Report shall be generated each month. A copy shall be submitted to the Executive Secretary by e-mail as soon as the report is approved by the CAMDS.

Monitoring changes are processed using AMSCM-OPDC Form 5020-R-E, *Request for Change of Monitoring system*. All requested information must be provided and required signatures obtained before any monitoring changes will be made. An Example of this form is provided in Appendix D. Specific monitoring requirements for new tests and/or processes shall be submitted Executive Secretary for review and approval.

13.3.1 Primary Monitoring Plan/Report

Primary Monitoring Report is generated from the Monitoring Station Database, and lists all monitoring stations used at the CAMDS Site, DCD perimeter, and Area 10 (Example report, Appendix A). The Primary Monitoring Report is available for review ~~by all personnel through the DCD Network~~ at the CMO. The Primary Monitoring Report provides the following information:

Site - Monitors are in Area 10, the CAMDS, or the Perimeter.

Station - Station numbers shall maintain the continuity of sample locations for historical purposes. Once a station number is assigned, it cannot be used again to designate any other location.

Nomenclature - Location description of monitored area tied to a building number or activity area.

Operational Status - The Operating stations, which are active, are listed with an "A". Inactive stations are designated with an "I". These stations are kept in reserve and may be re-activated by a request of the Monitoring Division. Stations that are no longer utilized are not shown in the Monitoring Reports, but shall remain a part of the Monitoring Station Database (designation "P") records for historical purposes.

NRT – Near Real Time monitors, either an ACAMS or an MINCAMS

NRT Agent - type of Agent monitored.

NRT AEL Level - AEL level of agent monitored.

DAAMS Agent - Historical Monitoring.

DAAMS Sample - The time that the DAAMS tubes are aspirated.

DAAMS AEL Level – AEL level of agent monitored.

Remarks – Station specific information.

13.3.2 **Secondary Monitoring Report**

The Secondary Monitoring Report is also generated from the Monitoring Station Database, and lists all monitoring stations used at the CAMDS Site, DCD perimeter, and Area 10. Appendix B is an example of a Secondary Monitoring Report. It gives additional information on the monitoring station to include, the corresponding sketch number and the ventilation category of the station. ~~The Secondary Monitoring Report is available for review by all personnel through the DCD Network.~~

Station Number - Station numbers shall maintain the continuity of sample locations for historical purposes. Once a station number is assigned, it cannot be used again to designate any other location.

Operational Status – The Operating stations, which are active, are listed with an “A”. Inactive stations are designated with an “P”. These stations are kept in reserve and may be re-activated by a request of the Monitoring Division. Stations that are no longer utilized are not shown in the Monitoring Reports, but shall remain a part of the Monitoring Station Database (designation “P”) records for historical purposes.

Annunciator Panel Number - The number appearing on the electrical Annunciator Panel in the Control Room that signals with both flashing lights and a audible alarm when the NRT monitors are in alarm or malfunctioning.

Sample Line Length - Total length of the sampling line with an accuracy of ± 20 percent.

Line Material - The monitoring line is constructed from this material.

Floor Plan Sketch Number - Monitor location (Appendix C)

Power Type - Power type is the type of power system used to run the monitors and also if there is emergency back-up power in case of power failure.

Floor Level of Unit - The level of the monitors in multi-story buildings.

Ventilation Category update - Ventilation Category for each monitored area.

14.0 **CAMDS SITE SKETCHES**

Appendix C is a collection of the CAMDS Site sketches showing station locations and Table 14-1 lists locations and sketch numbers.

The sketches contained in Appendix C are specially sized and contain only information pertinent to the Monitoring Plan. These special sketches contain only the information required to clearly

NOX PRE FILTER DATA

Thorpe, Lyman H CMA-DCD

From: Freudenberger, Steven B CON STC/MEC
Sent: Wednesday, April 26, 2006 3:43 PM
To: 'Michelle Weis'; Levi, Walt W CMA-DCD; Thorpe, Lyman H CMA-DCD; Cormier, Raymond E CMA-DCD
Cc: Draper, Kevin CMA-DCD; Cunningham, Gregory P CON SCITECH; Rydalch, Sheree A CON MELLOR
Subject: NOX filter studies
Signed By: steven.freudenberger@us.army.mil
Attachments: HD 12Hr WPL Jan06 - Mar06.xls; HD GPL Jan06 - Mar06.xls; NOx prefilter study Data2.xls

HD Pre-Filter Pad Studies

1. **21 Day NOX Study** – A NOX Pre-filter was placed on Station 184 for normal use for the time period of March 23 - April 13, 2005. The same filter was used throughout the study. During this time QP samples were aspirated and analyzed from this station. The QPs were analyzed daily and a percent recovery was calculated for each QP. Over the 22 day period (41 data points) no trending was observed (attached is the plot), there does not appear to be any degradation of the filter that would affect the recovery of the QP. A statistical analysis of this data set was also performed. Data for the first fourteen days was compared to data from the last 14 days and at a 95% confidence level this is no statistical difference between the two data sets. The statistics are summarized below.

WPL Method:

First 14 Tests	Last 14 Tests
101.81	87.31
97.09	83.22
96.44	102.25
93.08	96.48
91.38	93.35
90.95	85.37
103.43	97.61
97.34	109.34
111.11	76.73
111.89	98.10
95.75	103.81
98.86	99.25
109.72	94.03
118.11	120.77

t-Test: Two-Sample Assuming Unequal Variances

	First 14 Tests	Last 14 Tests

Mean	101.20929	96.259138
Variance	71.81152753	126.3609065
Observations	14	14
Hypothesized Mean Difference	0	
df	24	
t Stat	1.3157123	
P(T<=t) one-tail	0.100350578	
t Critical one-tail	1.7108823	
P(T<=t) two-tail	0.200701156	
t Critical two-tail	2.063898137	

Since the value of the t-statistic is less than the the value of the t- critical statistic, one cannot confidence) between the average of the first two weeks of filter use data and the second two weeks worth of data using same filter.

2. **WPL and GPL Data Sets** – Also, recent data was also analyzed from the WPL(data and charts attached) and GPL(data and charts attached) stations for each method. Data sets of one and two week sets were analyzed. New NOX filters were used for each data set and the averages for the first three data points for each data set were compared to the last three data points of each data set, again at a 95% confidence level this is no statistical difference between the two data sets. The statistics are summarized below.

WPL Method: New NOX equals first 3 Days of observations and End NOX equals last 3 days of same filter, data sets 14 days

GPL Method: New NOX equals first 2 Days of observations and End NOX equals last 2 days of same filter, data sets 7 and 14 days

DB-17 Method (WPL)

t-Test: Two-Sample Assuming Unequal Variances

	<i>New NOX</i>	<i>End NOX</i>
Mean	0.91990634	0.834261431
Variance	0.031522129	0.073185562
Observations	18	18
Hypothesized Mean Difference	0	
df	29	
t Stat	1.122919212	
P(T<=t) one-tail	0.13534131	
t Critical	1.699127097	

DB-210 Method (GPL)

t-Test: Two-Sample Assuming Unequal Vari

	<i>New NOX</i>	<i>End NOX</i>
Mean	0.900852	0.753498
Variance	0.112178	0.043293
Observations	18	20
Hypothesized Mean Difference	0	
df	28	
t Stat	1.6081	
P(T<=t) one-tail	0.059519	
t Critical	1.7011	

one-tail

P(T<=t) two-tail	0.27068262
t Critical two-tail	2.045230758

DB-210 Method (WPL)

t-Test: Two-Sample Assuming Unequal Variances

	New NOX	End NOX
Mean	0.868557778	0.823997785
Variance	0.040033073	0.039667683
Observations	18	18
Hypothesized Mean Difference	0	
df	34	
t Stat	0.669653504	
P(T<=t) one-tail	0.253800633	
t Critical one-tail	1.690923455	
P(T<=t) two-tail	0.507601266	
t Critical two-tail	2.032243174	

one-tail

P(T<=t) two-tail	0.119038
t Critical two-tail	2.048409

DB-17 Method (GPL)

t-Test: Two-Sample Assuming Unequal Vari

	New NOX	End NOX
Mean	0.75769	0.750162
Variance	0.019779	0.028355
Observations	18	20
Hypothesized Mean Difference	0	
df	36	
t Stat	0.1501	
P(T<=t) one-tail	0.440781	
t Critical one-tail	1.6883	
P(T<=t) two-tail	0.881562	
t Critical two-tail	2.028091	

Based on the fact that in each scenario the t-Stat value is less than the Critical value of t, the Hypo difference between the fresh filter and the used filter of Zero *cannot* be rejected at the 95% confidence level.

- Conclusion** – The two different studies show that if the NOX filter are used for two weeks there is no indications that degradation is occurring over a two week period. Recommend that NOX filters be used for a maximum of two weeks. Further studies can be conducted to determine if longer periods can be used.
- POC is Steve Freudenberger x 4491